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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/020,172	12/18/2001	Ahmet Karakas	56162.000357	9307

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EXAMINER

SWERDLOW, DANIEL

ART UNIT	PAPER NUMBER
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2644

DATE MAILED: 03/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/020,172

Applicant(s)

KARAKAS ET AL.

Examiner

Daniel Swerdlow

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 December 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 March 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>05/24/02</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

1. Examiner appreciates applicant's providing a copy of the Information Disclosure Statement filed 24 May 2002, the original of which has not been available in the application file. Examiner has considered the references therein and an initialed copy of the IDS is provided with this Office action.

Drawings

2. The drawings were received on 25 March 2002. These drawings are acceptable.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 8, 12, 13, 21, 25 and 26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. Claims 8 and 21 recite the limitation "the second filtered output" in the second line.

There is insufficient antecedent basis for this limitation in the claims. To advance prosecution to the maximum extent possible, examiner makes prior art rejections below based on the interpretation that the recitation is intended as "an output".

6. Claims 12 and 13 are indefinite due to dependence from Claim 8.

7. Claims 25 and 26 are indefinite due to dependence from Claim 21.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1 through 8, 10 through 21, 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farhang-Boroujeny et al. (US Patent 6,853,626) in view of admitted prior art (APA).

Regarding Claim 1, Farhang-Boroujeny discloses an echo canceller for an asymmetric communication system that transmits and receives at different data rates (i.e., a dual rate echo canceller) (column 2, lines 46-49). Farhang-Boroujeny further discloses an echo cancellation filter (Fig. 2, reference 234; column 5, lines 25-28) that receives the output of a modulator (i.e., a transmit signal) (Fig. 2, reference 212; column 4, lines 17-19) and reconstructs a signal substantially identical to the echo signal (i.e., generates an output component representative of an echo signal associated with the transmit signal) (column 5, lines 34-37) and operates at a sampling rate of $f_s(J/K)$ (i.e., a transmit rate) (column 5, lines 28-32). Farhang-Boroujeny further discloses an upsampler (Fig. 2, reference 240; column 6, lines 4-7) that receives the reconstructed echo signal (i.e., output signal) and generates an upsampled signal by a factor (K/J) associated with the ratio of the sampling rates of the transmit and receive signals (i.e., a selected annex). Therefore, Farhang-Boroujeny anticipates all elements of Claim 1 except an annex selector for selecting at least one of a plurality of annexes. Applicant admits that the annexes that

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define the transmit and receive sampling rates of an ADSL transceiver are well known (disclosure: page 5, lines 4-10). It would have been obvious to one skilled in the art at the time of the invention to set the sampling rates in the echo canceller taught by Farhang-Boroujeny to operate with the well known annexes for the purpose of making the echo canceller operable with a local standard of ADSL operation. Further, there can be no invention in merely providing means to selectively alternate between one unpatentable configuration of elements and another unpatentable configuration of old elements, where there is no new or different function. See *The Duplan Corporation v. Deering Milliken, Inc., et al.*, 197 USPQ 342 (DC SC 1977).

10. Regarding Claim 2, Farhang-Boroujeny further discloses upsampling by zero filling (column 4, lines 24-29).

11. Regarding Claim 3, Farhang-Boroujeny further discloses the echo cancellation filter being an adaptive finite impulse response filter (column 5, lines 52-55).

12. Regarding Claim 4, Farhang-Boroujeny further discloses an interpolation filter (Fig. 2, reference 242; column 6, lines 10-16) that receives the upsampler output (i.e., the upsampled signal) and generates an output that corresponds to the first filtered output claimed and is subtracted from the ADC output that corresponds to the incoming signal claimed to cancel echo signals (i.e., generate a residual echo signal).

13. Regarding Claim 5, Farhang-Boroujeny further discloses the interpolation filter being a low pass filter (column 6, lines 10-13).

14. Regarding Claim 6, Farhang-Boroujeny further discloses an anti-aliasing filter (Fig. 2, reference 248; column 5, lines 17-19).

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15. Regarding Claim 7, Farhang-Boroujeny further discloses the anti-aliasing filter (Fig. 2, reference 248; column 5, lines 17-19) being an analog (i.e., fixed) filter.

16. Regarding Claim 8, Farhang-Boroujeny further discloses a decimator (i.e., down sampling block) (Fig. 2, reference 238; column 5, lines 47-52) that decimates (i.e., downsamples by a factor of K/J (associated with a selected annex).

17. Regarding Claim 10, Farhang-Boroujeny further discloses an upsampler (Fig. 2, reference 232; column 5, lines 28-32) that receives the output of a modulator (i.e., a transmit signal), upsamples by a factor (K) and provides the upsampled output to the echo canceller filter.

18. Regarding Claim 11, applicant admits that Annex A and Annex B of G.992.1 are well known (disclosure: page 5, lines 4-10). It would have been obvious to one skilled in the art at the time of the invention to use the well known annexes with the combination made obvious by Farhang-Boroujeny and admitted prior art for the purpose of making the echo canceller operable with a local standard of ADSL operation.

19. Regarding Claim 12, Farhang-Boroujeny further discloses subtraction of the echo canceller filter from the decimator output resulting in the error signal. As such, the decimator output inherently comprises the error signal.

20. Regarding Claim 13, Farhang-Boroujeny further discloses use of an LMS algorithm (column 7, lines 17-19).

21. Claims 14 through 21 and 23 through 26 are essentially similar to Claims 1 through 8 and 10 through 13, respectively, and are rejected on the same grounds.

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22. Claims 9 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farhang-Boroujeny in view of admitted prior art and further in view of Danstrom (US Patent 4,582,963).

23. Regarding Claim 9, as shown above apropos of Claim 1, the combination of Farhang-Boroujeny and admitted prior art makes obvious all elements except a delay block. Danstrom discloses a bulk time delay (i.e., delay block) (Fig. 1, reference z-d; column 1, lines 44-46). Danstrom further discloses that the use of a bulk time delay enhances efficiency of the adaptive filter (column 1, lines 16-28). It would have been obvious to one skilled in the art at the time of the invention to apply the bulk time delay taught by Danstrom to the combination made obvious by Farhang-Boroujeny and APA for the purpose of realizing the aforesaid advantages.

24. Claim 22 is essentially similar to Claim 9 and is rejected on the same grounds.

25. Claims 29, 30, 33 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farhang-Boroujeny in view of admitted prior art and further in view of Widrow et al. (Adaptive Signal Processing).

26. Regarding Claim 29, Farhang-Boroujeny further discloses use of an LMS algorithm (column 7, lines 17-19). However, Farhang-Boroujeny is silent as to the update formula used. Widrow discloses an LMS update formula: $\mathbf{W}_{k+1} = \mathbf{W}_k + 2\mu\epsilon_k\mathbf{X}_k$ (page 100, eq. 6.3) where \mathbf{W} is the weight vector that corresponds to the coefficient vector claimed, \mathbf{X} is the vector of input samples that corresponds to the data vector claimed, μ is the gain constant that corresponds to the step size claimed and ϵ is the error signal per equation 2.8, page 19. Widrow further discloses this formula practical, elegant, simple and efficient. It would have been obvious to one skilled in the art at the time of the invention to apply the update formula taught by Widrow to the

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combination made obvious by Farhang-Boroujeny and APA for the purpose of realizing the aforesaid advantages.

27. Regarding Claim 30, Farhang-Boroujeny further discloses an error signal (Fig. 2, reference ERROR) that corresponds to the error signal claimed and results from the subtraction from a receive signal (Fig. 2, output of 238) of an input signal (i.e., X) subjected to an upsample process (i.e., h^T) and a weight vector (i.e., W).

28. Claims 33 and 34 are essentially similar to Claims 29 and 30, respectively, and are rejected on the same grounds.

29. Claims 27, 28, 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farhang-Boroujeny in view of admitted prior art and further in view of Widrow et al. (Adaptive Signal Processing) and further in view of Dowling (US Patent 6,522,688).

30. Regarding Claim 27, as shown above apropos of Claim 29, the combination of Farhang-Boroujeny, APA and Widrow makes obvious all elements except the use of the Hankel matrix. Dowling discloses the use of the Hankel matrix in an echo canceller (column 26, lines 1-10). It would have been obvious to one skilled in the art at the time of the invention to apply the Hankel matrix as taught by Dowling to the combination made obvious by Farhang-Boroujeny, APA and Widrow for the purpose of optimizing the performance of the echo canceller.

31. Regarding Claim 28, Farhang-Boroujeny further discloses an error signal (Fig. 2, reference ERROR) that corresponds to the error signal claimed and results from the subtraction from a receive signal (Fig. 2, output of 238) of an input signal (i.e., X) subjected to an upsample process (i.e., h^T) and a weight vector (i.e., W).

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32. Claims 31 and 32 are essentially similar to Claims 27 and 28, respectively, and are rejected on the same grounds.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel Swerdlow whose telephone number is 703-305-4088. The examiner can normally be reached on Monday through Friday between 8:00 AM and 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh H. Tran can be reached on 703-305-4040. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ds
15 February 2005


Daniel Swerdlow
Patent Examiner
Au 2644